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RESEARCH ARTICLE

First records of *Poecilimon affinis* and *Isophya modesta* (Insecta, Orthoptera, Tettigoniidae) from Vrancea Mountains, Eastern Carpathians

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Abstract

We herein report the first record of two bush-cricket species, *Poecilimon affinis* and *Isophya modesta*, from Vrancea Mountains in the Eastern Carpathians, documented during our regular fieldwork conducted in the period 2013–2014. For *P. affinis*, Vrancea Mountains represent the new easternmost location in its Carpathian distribution range, extending approximately 60 km northeast from the previously known eastern limit, in Ciucaș Mountains. The discovery of *I. modesta* in montane habitats near Soveja is particularly significant, as this area is geographically isolated from other known populations and may represent an important biogeographical link between the Transylvanian and the Wallachian and Dobrogean populations.

Keywords

biogeography, bush-crickets, distribution, Eastern Carpathians, faunistics.

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Introduction

The Orthoptera fauna of the Carpathian Mountains represents a unique assemblage of species, shaped by complex geological history and climatic conditions (Krištín et al. 2013; Iorgu et al. 2017). The Eastern Carpathians constitute an important area for understanding species distribution patterns and potential refugial zones that may have harbored relict populations during Quaternary climatic oscillations (Mráz and Ronikier 2016). Positioned in the southern part of the Eastern Carpathians, Vrancea Mountains (*Munții Vrancei*) are a rugged, densely forested mountain range known for wild landscapes and relatively low human interference. The study area encompasses montane and submontane zones ranging from approximately 700 to 1785 m elevation (Goru peak). The region is characterized by a mosaic of mixed spruce-beech forests, mountain meadows, and forest-edge habitats that provide suitable environments for various Orthoptera species, protected in Putna-Vrancea Natural Park, one of Romania's wildest mountain areas. Historically, this landscape has shifted between forest and pasture due to human activities. In recent decades, some pastures have reverted to forest, but mountain meadows and grasslands remain important landscape features, especially at lower altitudes and on gentler slopes (Istrate et al. 2023). Permanent grasslands can be found up to 1340 m altitude, often on flat or moderately sloped land (Oprea and Maruşca 2022). The meadows are highly diverse, with an average of 85 plant species per community. Productive grassland associations include *Cirsio cani-Festucetum pratensis*, while less productive, nutrient-poor meadows are dominated by *Festuca capillata* and *Nardus stricta* (Oprea and Maruşca 2022). The region is also home to endemic and rare species, such as the recently described *Hieracium vranceae*, restricted to rocky habitats (Mráz et al. 2019).

Bush-crickets of the family Tettigoniidae are important constituents of meadow and forest-edge ecosystems (Iorgu 2025). Two species of particular biogeographical interest are *Poecilimon affinis* (Frivaldszky, 1867) and *Isophya modesta* Frivaldszky, 1868, both of which exhibit restricted and disjunct distribution patterns in southeastern Europe (Chobanov and Heller 2010; Chobanov et al. 2013). *Poecilimon affinis* is a member of the speciose genus *Poecilimon*, which includes numerous endemic and range-restricted species distributed from the Apennines to Eastern Siberia and Central Tien Shan. The primary center of speciation and diversity for the *P. ornatus* group is confined to the Pontic region, with only limited taxa found outside the Balkans, Asia Minor, and the Caucasus (Chobanov and Heller 2010). Prior to this study, the easternmost known localities for *P. affinis* in Romania were situated west of Ciucaș Mountains in the Southern Carpathians (Kis 1962). In Romania, the species' distribution pattern suggests a western and southern Carpathian affinity, making any eastern range extensions particularly significant for understanding dispersal corridors and historical connections between mountain ranges (Iorgu et al. 2008).

Isophya modesta belongs to a taxonomically challenging genus characterized by high levels of endemism and cryptic diversity (Orci and Heller 2004; Iorgu et al. 2017). Genus *Isophya* comprises numerous closely related taxa, the classification of which

is challenging due to morphological and bioacoustic transitions, as well as observed intraspecific genetic variability (Chobanov et al. 2013; Chobanov et al. 2017). The species *I. modesta* has been recorded from scattered localities in Romania, including populations from Transylvania, Banat, Wallachia and Dobrogea, but the connections between these population groups have remained unclear (Kis 1960; Iorgu et al. 2008).

Vrancea Mountains, located north of the curvature zone of the Eastern Carpathians, represent an area that has received relatively limited attention from entomologists. This paper presents the first documented records of *P. affinis* and *I. modesta* from these mountains, discusses their biogeographical significance, and considers implications for understanding the distribution patterns of orthopterans in the Eastern Carpathians.

Material and Methods

Fieldwork was conducted in 2013–2014 and specific survey locations included Soveja and Lăcăuți – Goru – Dealul Negru – Cristianu – Coza montane areas in Putna-Vrancea Natural Park. The effort focused on habitats known to support bush-cricket diversity, including mesophilous and thermophilous grasslands, forest clearings, and ecotonal zones between forest and open habitats. Orthopterans were collected by hand or with the aid of an entomological net, and identified based on morphological characters using the standard identification keys (Kis 1976). All material is deposited in "Grigore Antipa" National Museum of Natural History, Bucharest. The distribution maps for the two species in Romania were created using information from literature, personal data, as well as online citizen science platforms (iNaturalist 2025) and social media (Facebook 2025).

Results

Order Orthoptera
Suborder Ensifera
Family Tettigoniidae

Poecilimon affinis (Frivaldszky, 1867) (Fig. 1A, Fig. 2)

Material: 2 ♂ 1 ♀, Vrancea Mt., 45.8861°N 26.5651°E, 30.06.2013, leg. I.Ș. Iorgu.

Other material: 3 ♂ 1 ♀, Bucegi mt., 45.4092°N 25.4863°E, 14.08.2007, leg. E.I. Iorgu and I.Ș. Iorgu; 1 ♂, Bucegi mt., 45.4425°N 25.4613°E, 14.08.2007, leg. E.I. Iorgu and I.Ș. Iorgu; 5 ♂ 3 ♀, Domogled mt., 44.8622°N 22.4188°E, 23.08.2008, leg. E.I. Iorgu and I.Ș. Iorgu; 8 ♂ 5 ♀, Ciucaș mt., 45.5156°N 25.9215°E, 23.07.2009, leg. E.I. Iorgu and I.Ș. Iorgu; 6 ♂ 5 ♀, Cozia mt., 45.3172°N 24.338°E, 09.08.2009, leg. E.I. Iorgu and I.Ș. Iorgu; 2 ♂, Grohotiș mt., 45.4585°N 25.8828°E, 17.07.2010, leg. I.Ș. Iorgu; 5 ♂ 3 ♀, Buila-Vânturarița mt., 45.2437°N 24.1092°E, 18.08.2010, leg. E.I. Iorgu and I.Ș. Iorgu; 2 ♂ 3 ♀, Parâng mt., 45.3312°N 23.6733°E, 19.08.2010, leg.

I.Ș. Iorgu; 2 ♂ 1 ♀, Parâng mt., 45.3895°N 23.6484°E, 19.08.2010, leg. I.Ș. Iorgu; 5 ♂ 4 ♀, Ciucaș mt., 45.4815°N 25.9802°E, 29.07.2011, leg. E.I. Iorgu and I.Ș. Iorgu; 1 ♂, Piatra Craiului mt., 45.5267°N 25.2127°E, 29.07.2012, leg. I.Ș. Iorgu; 2 ♂,

Figure 1. Habitus of: **A** *Poecilimon affinis* ♂, and **B** *Isophya modesta* ♂, in Vrancea Mountains.

Piatra Craiului mt., 45.5524°N 25.2427°E, 29.07.2012, leg. I.Ș. Iorgu; 2 ♂, Cindrel mt., 45.5881°N 23.8147°E, 18.08.2012, leg. I.Ș. Iorgu; 1 ♂, Parâng mt., 45.3824°N 23.5016°E, 10.07.2013, leg. I.Ș. Iorgu; 2 ♂, Piatra Mare mt., 45.5493°N 25.6437°E, 31.07.2013, leg. I.Ș. Iorgu; 7 ♂ 5 ♀, Postăvaru mt., 45.5685°N 25.5668°E, 10.08.2013, leg. I.Ș. Iorgu; 1 ♂, Iezer-Păpușa mt., 45.4811°N 25.0342°E, 02.11.2013, leg. I.Ș. Iorgu; 1 ♂, Apuseni mt., 46.4913°N 22.6754°E, 09.08.2014, leg. I.Ș. Iorgu; 1 ♂, Făgăraș mt., 45.5879°N 25.0271°E, 13.09.2017, leg. I.Ș. Iorgu; 3 ♂ 1 ♀, Făgăraș mt., 45.6013°N 24.7979°E, 13.09.2017, leg. I.Ș. Iorgu; 1 ♂, Făgăraș mt., 45.6005°N 24.6479°E, 14.09.2017, leg. I.Ș. Iorgu; 3 ♂ 3 ♀, Făgăraș mt., 45.5807°N 24.4354°E, 04.09.2018, leg. I.Ș. Iorgu; 1 ♂, Făgăraș mt., 45.6251°N 24.6776°E, 07.09.2018, leg. I.Ș. Iorgu; 1 ♂ 1 ♀, Retezat mt., 45.3268°N 22.9004°E, 26.08.2019, leg. I.Ș. Iorgu; 2 ♂ 1 ♀, Vâlcan mt., 45.308°N 23.3132°E, 27.08.2019, leg. I.Ș. Iorgu; 3 ♂ 2 ♀, Aninei mt., 44.9616°N 21.8371°E, 21.06.2022, leg. E.I. Iorgu and I.Ș. Iorgu; 1 ♂ 1 ♀, Aninei mt., 44.9996°N 21.8659°E, 21.06.2022, leg. E.I. Iorgu and I.Ș. Iorgu; Pasul Lainici, 45.33°N 23.37°E (Pungur 1899, in Kis 1962); Baziaș 44.8152°N 21.3939°E (Pungur 1899, in Kis 1962); Postăvarul, 45.5685°N 25.5668°E (Müller 1922–1924, in Kis 1962); Bucegi, 45.4425°N 25.4613°E (Ramme 1942, in Kis 1962); Poiana, 45.3294°N 24.4465°E (Ramme 1942, in Kis 1962); Turnu Roșu, 45.60°N 24.32°E (Vasiliu and Agapi 1958, in Kis 1962); Pleașa peak, 46.3252°N 23.5253°E (Kis 1962); Cerna Valley, 45.0231°N 22.6093°E (Kis 1962; Kis 1968); Cheile Turzii, 46.5669°N 23.6803°E (Szilády 1922, in Kis 1962; Kis 1968); Ciucaș mt., 45.5122°N 25.9361°E (Kis 1962; Kis 1968); Cozia mt., 45.3169°N 24.3423°E (Ramme 1942, in Kis 1962; Kis 1968); Domogled mt., 44.8716°N 22.4424°E (Pungur 1899, in Kis 1962; Kis 1968); Moldova Nouă, 44.7368°N 21.6803°E (Kis 1968); Muntele Mic, 45.3565°N 22.4755°E (Kis 1968); Oravița, 45.0292°N 21.7135°E (Kis 1968); Parâng mt., 45.3697°N 23.5136°E (Kis 1962; Kis 1968); Polovragi, 45.1850°N 23.8053°E (Kis 1962; Kis 1968); Retezat mt., 45.3019°N 22.9117°E (Szilády 1906, in Kis 1962; Kis 1968); Semenic mt., 45.1879°N 22.0738°E (Kis 1968); Sinaia, 45.3548°N 25.5077°E (Kis 1968); Valea Beiului, 44.9332°N 21.7741°E (Kis 1968); Retezat mt., 45.3763°N 22.8511°E, 20.08.2024, leg. R. Zaharia; Poiana Stânei, 45.3687°N 25.5227°E, 18.07.2020, leg. M.E. Eftimie (facebook); Brașov, 45.5834°N 25.55344°E, 25.07.2022, leg. I. Farr (inaturalist); Bărbătești, Vâlcea, 45.2392°N 24.0927°E, 08.06.2024, leg. I. Miu (inaturalist); Sălașu De Sus, Retezat, 45.4069°N 22.8802°E, 11.08.2024 (inaturalist).

Remarks: the species was recorded in mesophilous montane meadows, usually with *Juniperus* sp. and *Pinus mugo*, at elevations between approximately 500 and 2000 m. The record from Vrancea Mountains represents the easternmost known locality for the species in Romania, extending its range approximately 60 km east from the Ciucaș Mountains, which previously marked the eastern limit of the species' distribution in the Romanian Carpathians (Kis 1962; Kis 1968; Iorgu I.Ș., personal data). This finding suggests that *P. affinis* has a more continuous distribution along the Carpathian arc than previously documented.

Isophya modesta Frivaldszky, 1868 (Fig 1 B, Fig 2)

Material: 5 ♂ 3 ♀, Soveja, 45.9763°N 26.6307°E, 27.06.2014, leg. I.Ș. Iorgu.

Other material: 3 ♂ 2 ♀, Comana, 44.153°N 26.1593°E, 23.06.2010, leg. E.I. Iorgu and I.Ș. Iorgu; 11 ♂ 7 ♀, Babadag forest, 44.8133°N 28.7089°E, 05.06.2011, leg. I.Ș. Iorgu; 8 ♂ 2 ♀, Babadag forest, 44.8169°N 28.7428°E, 05.06.2011, leg. I.Ș. Iorgu; 1 ♂ 3 ♀, Comana, 44.1703°N, 26.192°E, 15.06.2012, leg. E.I. Iorgu and I.Ș. Iorgu; 7 ♂ 4 ♀, Codru monastery, 44.8151°N 28.6735°E, 28.05.2014, leg. I.Ș. Iorgu; 5 ♂ 2 ♀, Babadag, 44.8729°N 28.6826°E, 28.05.2014, leg. I.Ș. Iorgu; 2 ♂ 1 ♀, Visterna, 44.8562°N 28.7809°E, 28.05.2014, leg. I.Ș. Iorgu; 3 ♂ 1 ♀, Sălciua, 46.3761°N 23.4571°E, 11.06.2015, leg. I.Ș. Iorgu; 1 ♂, Șardu, 46.8985°N 23.3617°E, 30.06.2015, leg. I.Ș. Iorgu; 8 ♂ 4 ♀, Domogled mt., 44.8622°N 22.4188°E, 17.07.2015, leg. I.Ș. Iorgu; 3 ♂, Hamcearca, 45.0978°N 28.3875°E, 03.06.2016, leg. I.Ș. Iorgu; 2 ♂, Atmagea, 44.9549°N 28.4072°E, 03.06.2016, leg. I.Ș. Iorgu; 4 ♂ 1 ♀, Horia, 45.0075°N 28.4517°E, 03.06.2016, leg. I.Ș. Iorgu; 2 ♂, Alba, 45.0822°N 28.5083°E, 04.06.2016, leg. I.Ș. Iorgu; 3 ♂ 1 ♀, Niculițel, 45.1626°N 28.4812°E, 04.06.2016, leg. I.Ș. Iorgu; 1 ♂, Somova, 45.1728°N 28.6288°E, 04.06.2016, leg. I.Ș. Iorgu; 7 ♂ 3 ♀, Slava Rusă, 44.8351°N 28.6355°E, 09.07.2017, leg. I.Ș. Iorgu; 5 ♂ 1 ♀, Slava Rusă, 44.8676°N 28.5947°E, 09.07.2017, leg. I.Ș. Iorgu; 1 ♂, Caugagia, 44.7967°N 28.6404°E, 10.07.2017, leg. I.Ș. Iorgu; 1 ♂, Tulcea, 45.1655°N 28.8377°E, 10.07.2017, leg. I.Ș. Iorgu; 12 ♂ 9 ♀, Enisala, 44.8611°N 28.8352°E, 09.06.2018, leg. E.I. Iorgu and I.Ș. Iorgu; 2 ♂, Stejaru, 44.7814°N 28.5332°E, 12.07.2018, leg. I.Ș. Iorgu; 1 ♀, Ciucurova, 44.9008°N 28.5099°E, 12.07.2018, leg. I.Ș. Iorgu; 7 ♂ 2 ♀, Priopcea peak, 45.1224°N 28.2554°E, 28.06.2019, leg. I.Ș. Iorgu; 9 ♂ 3 ♀, Măcin mt., 45.1626°N 28.2892°E, 28.06.2019, leg. I.Ș. Iorgu; 6 ♂ 1 ♀, Măcin mt., 45.2215°N 28.2442°E, 28.06.2019, leg. I.Ș. Iorgu; 1 ♀, Frumoasa, 46.4489°N 25.8946°E, 12.07.2019, leg. I.Ș. Iorgu; 3 ♂, Sândominic, 46.5714°N 25.7769°E, 10.06.2023, leg. I.Ș. Iorgu; 5 ♂ 2 ♀, Sândominic, 46.5775°N 25.7785°E, 10.06.2023, leg. I.Ș. Iorgu; 1 ♂, Apold, 46.1071°N 24.8310°E, 22.06.2023, leg. I.Ș. Iorgu; 9 ♂ 4 ♀, Delnița, 46.4184°N 25.8407°E, 01.07.2023, leg. I.Ș. Iorgu; 3 ♂, Sălătrucu de Jos, 45.3092°N 24.5073°E, 16.07.2023, leg. I.Ș. Iorgu; 1 ♂ 1 ♀, Cernei mt., 45.0375°N 22.4835°E, 03.08.2023, leg. I.Ș. Iorgu; 1 ♂, Răscruci, 46.8836°N 23.7307°E, 24.08.2023, leg. I.Ș. Iorgu; Pricopan, 45.25°N 28.19°E (Knechtel and Popovici-Bâznoșanu 1959; Frey-Gessner 1899, in Kis 1960; Kis 1963); Isaccea – Cocoș monastery, 45.2200°N 28.4200°E (Knechtel and Popovici-Bâznoșanu 1959; Frey-Gessner 1899, in Kis 1960; Kis 1963); Tulcea, 45.15°N 28.79°E (Knechtel and Popovici-Bâznoșanu 1959; Lehrer and Kis 1981); Oradea, 47.0737°N 21.9501°E (Pungur 1899, in Kis 1960); Baia Mare, 47.6679°N 23.5366°E (Pungur 1899, in Kis 1960); Nușfalău, 47.2122°N 22.7173°E (Pungur 1899, in Kis 1960); Gârceiu, 472569°N 23.0783°E (Pungur 1899, in Kis 1960); Zalău, 47.1685°N 23.0926°E (Pungur 1899, in Kis 1960); Cluj, 46.7340°N 23.5720°E (Pungur 1899, in Kis 1960; Kis 1968); Zău de Câmpie, 46.6202°N 24.1379°E (Pungur 1899, in Kis 1960; Kis 1968); Săcalul (Socolu) de Câmpie, 46.7923°N 24.5077°E (Pungur 1899, in Kis 1960); Odorhei, 46.2948°N 25.2733°E (Pungur 1899, in Kis 1960); Filiaș, 46.2700°N 25.0351°E (Pungur 1899, in Kis 1960); Comana, 44.1588°N 26.1561°E (Frey-Gessner 1899, in Kis 1960; Kis 1968);

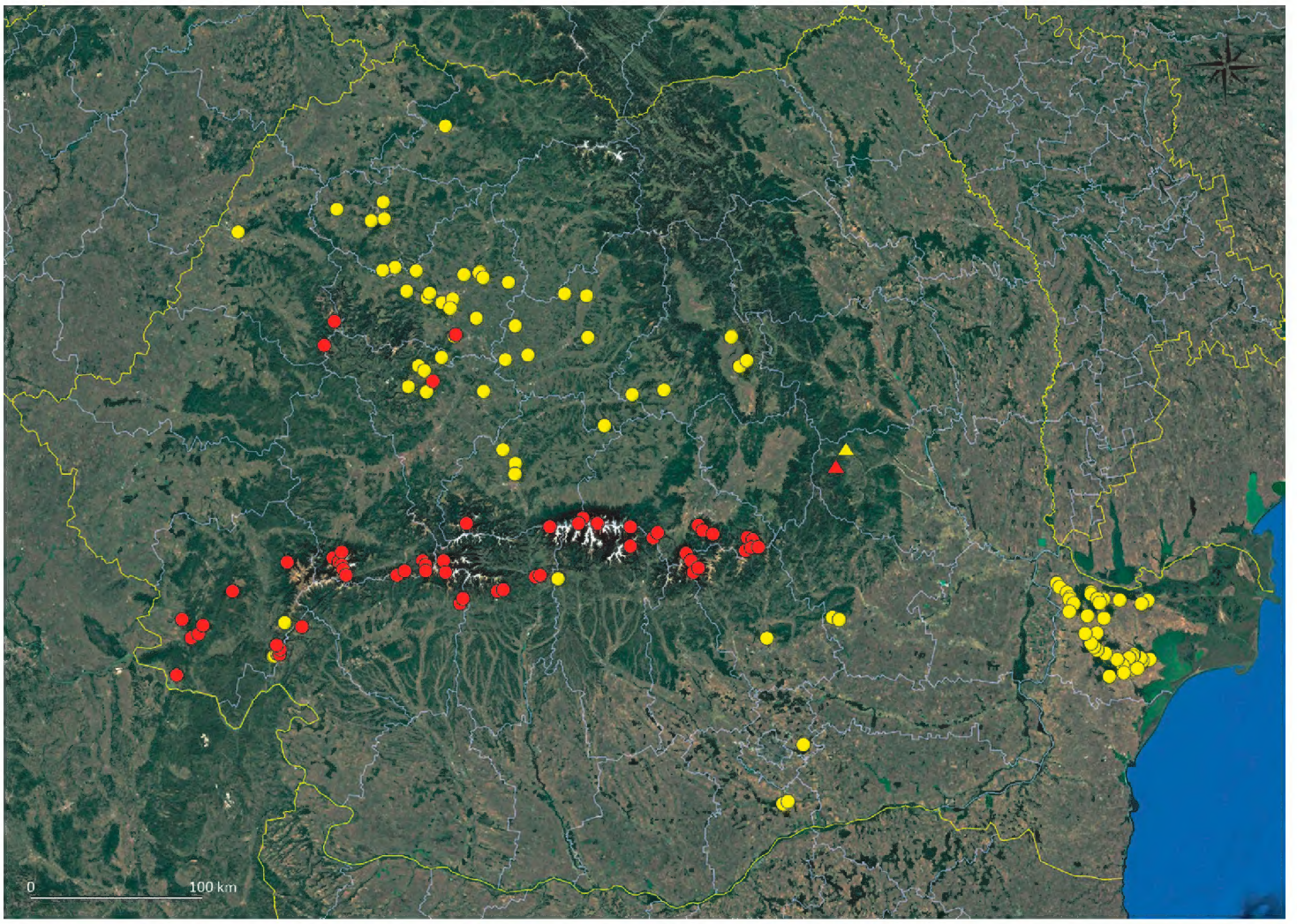

Figure 2. Distribution map of *Poecilimon affinis* (red dots) and *Isophya modesta* (yellow dots) in Romania, according to personal, published and citizen science data. The new localities in Vrancea Mountains are marked with red, respectively yellow triangles. Map data 2025 (C) Google.

Brănești, 44.4627°N 26.3051°E (Zottu 1903, in Kis 1960); Scăeni (Boldești-Scăeni), 45.0114°N 26.0431°E (Zottu 1905, in Kis 1960); Măcin, 45.27°N 28.17°E (Müller 1932, in Kis 1960; Lehrer and Kis 1981); Iaila (General Praporgescu), 45.0066°N 28.3667°E (Müller 1932, in Kis 1960); Domogled 44.8744°N 22.4395°E (Ramme 1942, in Kis 1960; Kis 1968); Șura Mare, 45.8474°N 24.1677°E (Vasiliu and Agapi 1958, in Kis 1960); ZackeI hill, 45.9026°N 24.1691°E (Vasiliu and Agapi 1958, in Kis 1960); Haşag, 45.9730°N 24.0725°E (Vasiliu and Agapi 1958, in Kis 1960); Reghin, 46.7827°N 24.6757°E (Vasiliu and Agapi 1958, in Kis 1960); Cheile Turzii, 46.5596°N 23.6750°E (Kis 1960; Kis 1968); Suciag (Suceagu), 46.7818°N 23.471994°E (Kis 1960; Kis 1968); Băile Herculane, 44.8592°N 22.4096°E (Kis 1960; Kis 1968); Babadag, 44.8889°N 28.7166°E (Kis 1960; Kis 1963; Kis 1968; Lehrer and Kis 1981); Ciucurova, 44.92°N 28.45°E (Kis 1968; Lehrer and Kis 1981); Geaca, 46.8476°N 24.0753°E (Kis 1968); Piatra Ceții, 46.2657°N 23.4800°E (Kis 1968); Greci, 45.185°N 28.26°E (Lehrer and Kis 1981); Niculițel, 45.18°N 28.51°E (Lehrer and Kis 1981); Rimetea, 46.29°N 23.34°E (Orci and Heller 2004); Babadag hills, 44.8129°N 28.7056°E, 07.06.2009 (Chobanov et al. 2013;); Visterna, 44.8696°N 28.7679°E, 06.06.2011 (Chobanov et al. 2013); Aghireș, 47.157°N 22.992°E, 02–03.06.2014, leg. A. Orosz, G. Puskás, Z. Soltész, M. Tóth (Puskás 2015); Sfăraş, 46.897°N 23.101°E, 13.08.2014, leg. G. Katona,

A. Orosz, G. Puskás (Puskás 2015); Bonțida, 46.8956°N 23.8487°E, 05.07.2025, leg. T. Sos (facebook); Căpușu Mare, 46.8137°N 23.1532°E, 11.06.2025, leg. A. Ruicănescu (facebook); Cicârd, 46.2757°N 23.9134°E, 23.05.2025, leg. T. Sos (facebook); Cluj, 46.7548°N 23.6518°E, 20.06.2020, leg. V. Mureșan (facebook); Dealurile Niculițelului, Tulcea, 45.1840°N 28.4660°E, 16.06.2019, leg. I.N. Ciocanel (facebook); Feleacu, Cluj, 46.7057°N 23.6347°E, 15.07.2021, leg. C. Buzelan (facebook); Greci, Tulcea, 45.1957°N 28.2640°E, 26.05.2018, leg. Gabriel Ice (facebook); Mureș, 46.5658°N 24.6931°E, 13.07.2025, leg. Nicole Ana (facebook); Sălciua, Alba, 46.4004°N 23.4114°E, 2008, leg. C. Szabo (facebook); Apold, Mureș, 46.1086°N 24.8317°E, 02.07.2025 (inaturalist); Breaza, Buzău, 45.1177°N 26.5224°E, 25.05.2024, leg. M. Zachi (inaturalist); Cuzaplac, Sălaj, 46.9135°N 23.1964°E, 28.06.2019 (inaturalist); Luduș, Mureș, 46.4430°N 24.0707°E, 13.07.2025, leg. N. Gherman (inaturalist); Iernut, Mureș, 46.4693°N 24.2412°E, 03.06.2025, leg. S. Czyżewski (inaturalist); Iernut, Mureș, 46.4692°N 24.2412°E, 04.06.2025, leg. S. Czyżewski (inaturalist); Jucu, Cluj, 46.9019°N 23.8524°E, 05.07.2025, leg. Rák Gergő (inaturalist); Jucu, Cluj, 46.8700°N 23.8795°E, 21.06.2025, leg. R. Vlk (inaturalist); Pietroasele, Buzău, 45.1054°N 26.5719°E, 25.05.2024, leg. M. Zachi (inaturalist); Ploscoș, Cluj, 46.6549°N 23.8356°E, 21.06.2025, leg. E. Buchtikova (inaturalist); Ploscoș, Cluj, 46.6552°N 23.8372°E, 21.06.2025, leg. R. Vlk (inaturalist); Ploscoș, Cluj, 46.6561°N 23.8388°E, 21.06.2025, leg. M. Řezníčková (inaturalist); Rimetea, Alba, 46.4478°N 23.5841°E, 07.07.2024, leg. Ś. Smoczyński (inaturalist).

Remarks: Specimens were encountered in hilly and montane grasslands and meadows, typically at elevations between 100 and 1100 m. The species prefers habitats with relatively dense herbaceous vegetation, often in areas with scattered shrubs or at forest margins. The discovery of *I. modesta* in Vrancea Mountains is located about 70 km far from previously known populations of *I. modesta* in Romania, which include scattered records from the Transylvanian Basin and from lowland and hilly areas of Wallachia and Dobrogea (Kis 1960; Kis 1968; Iorgu I.Ș., personal data). The geographical position of the new localities may represent an important link between the Transylvanian populations to the northwest and west, and the Wallachian and Dobrogean populations to the south and southeast. The species is likely to have a broader, yet under-recognized, distribution within suitable montane habitats of the Eastern Carpathians and these populations may constitute relict occurrences from a formerly extensive range.

Discussion

The new records of *Poecilimon affinis* and *Isophya modesta* in Vrancea Mountains offer insights into the small-scale biogeography of orthopterans within the Carpathians.

The eastward range extension of *P. affinis* to Vrancea Mountains suggests that the Eastern Carpathians may have provided suitable habitat corridors for the species' dispersal or persistence. The approximately 60 km gap between Ciucaș and Vrancea Mountains raises questions about the species' occurrence in Siriu or

Penteleu Mountains, where the species may be present, but has been overlooked due to insufficient survey effort in these areas. The population in Vrancea may be an isolated eastern outlier, maintained by suitable local conditions.

The discovery of *Isophya modesta* in the montane habitats of Vrancea Mountains and near Miercurea Ciuc is particularly intriguing. Previous knowledge of *I. modesta* distribution in Romania suggested disjunct population groups: the Transylvanian populations, the Banat populations, the Wallachian and Dobrogean populations. The new montane records from the Eastern Carpathians may represent a previously unknown distributional corridor connecting these large population groups. During cooler periods of the Pleistocene, montane corridors may have facilitated gene flow between populations that are now primarily restricted to lower elevations, and the current montane populations could represent relicts of a formerly more continuous distribution.

Both *P. affinis* and *I. modesta* were found in montane meadows and forest-edge habitats. These types of habitats are typical of traditional agricultural landscapes in the Carpathians, where grazing and haymaking have kept the areas open or semi-open for past centuries. Changes in farming practices, either intensification or abandonment, could threaten the orthopteran populations.

The Orthoptera fauna of the Romanian Carpathians includes numerous species with restricted or disjunct distributions. Recent faunistic work has revealed several new records and range extensions for various species (Szövényi and Orci 2008; Iorgu and Iorgu 2017; Iorgu 2014). Comprehensive understanding of Carpathian orthopterans remains incomplete, as significant deficiencies persist in faunistic survey coverage. The findings reported here for *P. affinis* and *I. modesta* contribute to the growing knowledge and emphasize the need for continued systematic surveys of Orthoptera diversity in the Carpathians.

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